

Claims 1-3, 5, and 7-8 were rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by U.S. Patent No. 4,804,636 to Groover, III et al. Claims 1-3 and 5-8 were rejected under 35 U.S.C. § 102(e) as being allegedly anticipated by U.S. Patent No. 5,911,114 to Naem. Claim 4 was rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Naem. Applicant has carefully considered the Examiner's comments and the cited art, and respectfully submits that independent claim 1 is patentably distinct from the cited art for at least the following reasons.

The present disclosure is directed to semiconductor devices having an integral resistance element. A second resistance pattern is provided adjacent to a first resistance pattern at a second level lower than the first level of the first resistance pattern, the second resistance pattern being electrically connected in series to the first resistance pattern to form the resistance element and the second resistance pattern having an edge defined by the first resistance pattern.

Groover, III et al., as understood by Applicant, relates to a process for making integrated circuits having titanium nitride triple interconnect. First poly, second poly, and moat are all interconnected by a TiN local interconnect.

Applicant respectfully submits that it is unclear which structures of Groover, III et al. are referred to in the Office Action. The Office Action states that Groover III, et al. shows "a first resistance pattern (poly-Si) on the substrate at a first level and a second resistance pattern (source/drain or moat) provided adjacent the first resistance pattern at a second level (in the substrate) lower than the first level" (see Office Action, p. 2, lns. 21-24; p. 3, ln. 1). The Office Action also states, in reference to Groover, III et al., that "[t]he second resistance pattern is formed in the substrate in the form of a silicide region (TiSi_2)" (see id., p. 3, lns. 9-10). As understood by Applicant, the TiSi_2 region and the source/drain region of Groover III,

et al. are distinct elements and are not coextensive (see id., Figs. 1-2).

In any event, as understood by Applicant, in the process of Groover, III et al. sidewall oxide filaments are located adjacent to a polysilicon gate. The sidewall oxide filaments separate the polysilicon gate from the silicide regions on the source/drain regions (see Groover, III et al., col. 7, lns. 3-13; Figs. 1-2). The filaments must be located at the edge of the polysilicon gate in order to electrically isolate the gate from the source/drain regions. The titanium nitrate layer and the titanium silicide regions are apparently formed by depositing titanium metal "everywhere" and heating the substrate (see id., col. 7, lns. 22-30). The placement of the material deposited and of the titanium silicide regions formed by the depositing process are therefore apparently dependent upon the exterior boundaries of the sidewall oxide filaments, consequently preventing any definition of an edge of either the upper or lower pattern by the other (see id., Figs. 1-2).

In contrast, as recited in independent claim 1, the second resistance pattern has an edge defined by the first resistance pattern. This formation of the second resistance pattern guarantees a high level of accuracy of the resistance.

It is therefore respectfully submitted that Applicant finds no teaching or suggestion in Groover, III et al. of a substrate and a resistance element formed on the substrate, the resistance element comprising a first resistance pattern provided on the substrate at a first level and a second resistance pattern provided adjacent to the first resistance pattern at a second level lower than the first level, the second resistance pattern being electrically connected in series to the first resistance pattern to form the resistance element, and the second resistance pattern having an edge defined by the first resistance pattern, as recited in independent claim 1.

Accordingly, Applicant submits independent claim 1 is patentably distinct from Groover,

III et al.

Naem, as understood by Applicant, relates to a method of simultaneous formation of salicide and local interconnects in an integrated circuit structure. Titanium and TiN films are deposited after formation of N+ and P+ junctions, and the structure is annealed in a nitrogen ambient to form a salicide film on the exposed source, drain, and gate regions.

The Office Action states that Naem discloses "a first resistance pattern (on field oxide region)" and "a second resistance pattern (source/drain) provided adjacent the first resistance pattern" (see Office Action, p. 3, lns. 16-18). As understood by Applicant, this reference to a first resistance pattern on the field oxide region corresponds to the polysilicon resistor depicted in Figs. 1A-1E of Naem. It is respectfully submitted that the source/drain region depicted in Fig. 1A does not have an edge defined by any part of the polysilicon resistor of Fig. 1A (see Naem, Figs. 1A-1E).

It is therefore respectfully submitted that Applicant finds no teaching or suggestion in Naem of a substrate and a resistance element formed on the substrate, the resistance element comprising a first resistance pattern provided on the substrate at a first level and a second resistance pattern provided adjacent to the first resistance pattern at a second level lower than the first level, the second resistance pattern being electrically connected in series to the first resistance pattern to form the resistance element, and the second resistance pattern having an edge defined by the first resistance pattern, as recited in independent claim 1.

Accordingly, Applicant respectfully submits independent claim 1 is patentably distinct from Naem.

The Office is hereby authorized to charge any additional fees that may be required in connection with this response and to credit any overpayment to our Deposit Account No. 03-

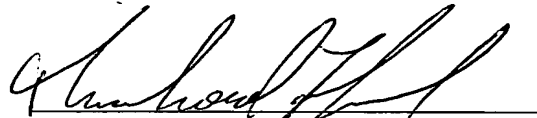
3125.

If a petition for an additional extension of time is required to make this response timely, this paper should be considered to be such a petition, and the Commissioner is authorized to charge the requisite fees to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Entry of this response and allowance of this application are respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Richard F. Jaworski', is written over a horizontal line.

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